

IMPACT OF SYSTEMS INTEGRATION  
ON PROFESSIONAL SERVICES VENDORS

INPUT



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**Marketing Analysis and Planning Services (MAPS)**

***The Impact of Systems Integration on Professional  
Services Vendors***

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## Abstract

In the past several years systems integration (SI) has emerged as an important market for all information services vendors. For some vendors, systems integration provides the opportunity to capture a significant amount of user expenditures for the design, development, implementation, and, sometimes, management of large and complex information systems. By the very nature of the effort, SI-type projects frequently also lead SI vendors to a “favored vendor” position with customers, resulting in a commanding account control position.

Both results (i.e., increased revenue and account control for SI vendors) may have an adverse impact on vendors that do not directly participate in this market as integrators. Loss of potential revenue to integrators and the need to market professional services through integrator channels are but two of the potential impacts that must be addressed by vendors who cannot—or will not—become systems integration providers.

Although the SI market has been and will continue to be the focus of study for INPUT’s Systems Integration Planning Service (SIPS), the impact of SI on non-SI vendors has received limited attention. In this new report, *The Impact of Systems Integration on Professional Services Vendors*, INPUT addresses these issues. Through a series of interviews with information services vendors, INPUT clarifies the impacts and offers strategic recommendations to counter these identified impacts.

This report contains 55 pages, including 17 exhibits.



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# Table of Contents

<b>I</b>	Introduction	1
	A. Reason for the Study	1
	B. Scope	1
	C. Report Methodology	2
<b>II</b>	Executive Overview	3
	A. Impact of SI on Professional Services Expenditures	3
	B. Impact of SI on Professional Services by Service Mode	4
	C. Service Buyer Requirements vs. Type of Service Offerings	5
	D. The Evolution of Professional Services	6
	E. Recommendations	7
<b>III</b>	Market Analysis and Forecast	9
	A. Market Overview	9
	1. Structure of the Market	9
	a. User Requirements...What Are They and Who Has Them?	10
	b. What Are the Types of Needs?	12
	c. How These Factors Argue for and against Non-SI Vendors—The Buyers' Perspective	14
	2. Vendors' Current Offerings	16
	B. Market Forecast	19
	1. Total Professional Services	19
	2. Professional Services by Mode and Type of Vendor	20
<b>IV</b>	The Professional Services Competitive Environment	23
	A. Competitive Forces	23
	B. The Liabilities of SI Contracting	25
	C. Competitive Strategies	27
	1. Fight 'Em	27
	2. Join 'Em	30

## Table of Contents (Continued)

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<b>V</b>	Recommendations	33
	A. Select a Horizon Focal Point	33
	B. Assess All the Opportunities and Risks	34
	1. Is Bigger Also Better?	35
	2. The Large Fish/Small Pond–Small Fish/Big Pond Dichotomy	35
	C. Assess Your Own Capabilities	36
	D. Plan a Clear Direction	36
	E. Work Your Plan	37
	F. Conclusions	37

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<b>A</b>	Appendix A: INPUT Definitions	39
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<b>B</b>	Appendix B: Professional Services Vendors Interview Protocol	53
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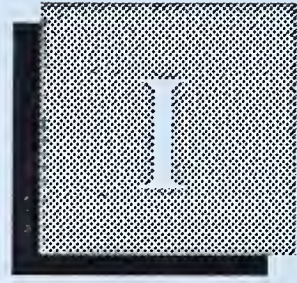
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# Exhibits

<b>II</b>	<ul style="list-style-type: none"> <li>-1 Impact of SI on Professional Services Expenditures 3</li> <li>-2 Impact of SI on Professional Services by Service Mode 5</li> <li>-3 Service Buyer Requirements vs. Type of Service Offerings 6</li> <li>-4 The Evolution of Professional Services 7</li> <li>-5 Recommendations 8</li> </ul>	
<b>III</b>	<ul style="list-style-type: none"> <li>-1 Dimensions of Systems Integration 10</li> <li>-2 Non-SI and SI Buyer Characteristics 11</li> <li>-3 Project Complexity Impact Trend 13</li> <li>-4 What Do Buyers Want? 14</li> <li>-5 How Buyer Requirements Impact Non-SI Vendors 15</li> <li>-6 Standalone, Full-Service, and SI Offerings 17</li> <li>-7 Impact of SI on Professional Services Expenditures 19</li> <li>-8 Impact of SI by Service Mode 21</li> </ul>	
<b>IV</b>	<ul style="list-style-type: none"> <li>-1 Compelling Forces in the SI Marketplace 23</li> <li>-2 SI Business Development Considerations 26</li> <li>-3 Strategies for Non-SI Vendors 28</li> </ul>	
<b>V</b>	<ul style="list-style-type: none"> <li>-1 Questions to Address in Business Planning 33</li> </ul>	



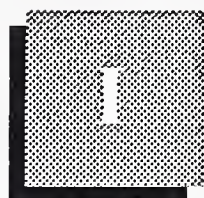


# Introduction

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## Introduction

### A

#### Reason for the Study

A plethora of economic events, emanating from both the U.S. and from abroad, has heightened the competitive intensity of American businesses. This, in turn, has increased the criticality of information resource management as one means of capturing and maintaining a competitive market position. But, for a variety of reasons, America's business executives have not been entirely able to meet these growing demands for information services. Increasingly, they are turning to outside vendors to provide the comprehensive information systems they require. In response, some vendors are now offering full systems integration (SI) services.

Although these events bode well for vendors that are able to meet the challenges of providing complex systems, the same may not be said for other vendors who, because of size, orientation, or other factors, cannot or will not be in a position to compete for these large projects. What may happen to these latter vendors? Will they continue to give market share to the systems integrators? Is the market for services so large that the impacts will not be severe? Or, must these "non-SI" vendors develop offensive and/or defensive strategies to effectively compete for professional service business?

These, and other questions, are the focus of this report. The intent is not only to gauge the impact of systems integration on non-SI professional services vendors, but also to seek strategies for these vendors that will lessen, if not eliminate, any adverse impacts and turn this rapidly emerging market into opportunities for these same vendors.

### B

#### Scope

In an attempt to focus on the critical issues, this report is targeted as follows:

1. INPUT's current definition of systems integration is assumed. In that definition systems integration is the provision of a "total solution" to a complex, multidisciplinary information systems requirement. Although

traditional systems integration projects may include computer and communications hardware as well as non-information services (e.g., building construction), only the expenditures for professional services are considered in this report (unless otherwise noted) in order to establish legitimate comparisons between the professional services activities of SI projects and standalone, non-SI professional services. (For additional definitions that may be of use in understanding this report, please see Appendix A.)

2. Only U.S.-based customers and vendors are included.
3. Only non-federal government markets are included because this is the scope of the Market Analysis and Planning Service (MAPS) program of INPUT, under which this report is offered. The industries included are all those of a commercial nature plus State & Local Government. The term "commercial" is applied to these industries in this report to avoid the more awkward "nonfederal" term.
4. Vendors of professional services—including systems integrators that, according to INPUT, are categorized as professional services providers are the only vendors considered. That is, information services vendors that may offer, or claim to offer, integration products or services but are not systems integrators, are not included.

## C

### Report Methodology

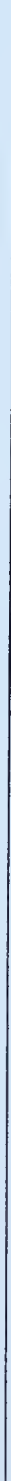
The research for this report came from several converging information streams:

1. In-depth interviews were conducted with professional services vendors using the interview protocol included as Appendix B.
2. INPUT also accessed its knowledge base of federal and commercial systems integration stemming from consulting studies it has conducted as well as its ongoing research and consulting program, Systems Integration Planning Service. Although no proprietary information is revealed, the knowledge gained is reflected in this report.
3. Additional background data for this report was garnered from presentations at a recent ADAPSO conference.

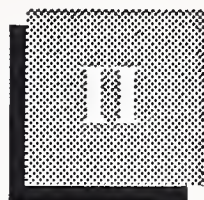




# Executive Overview







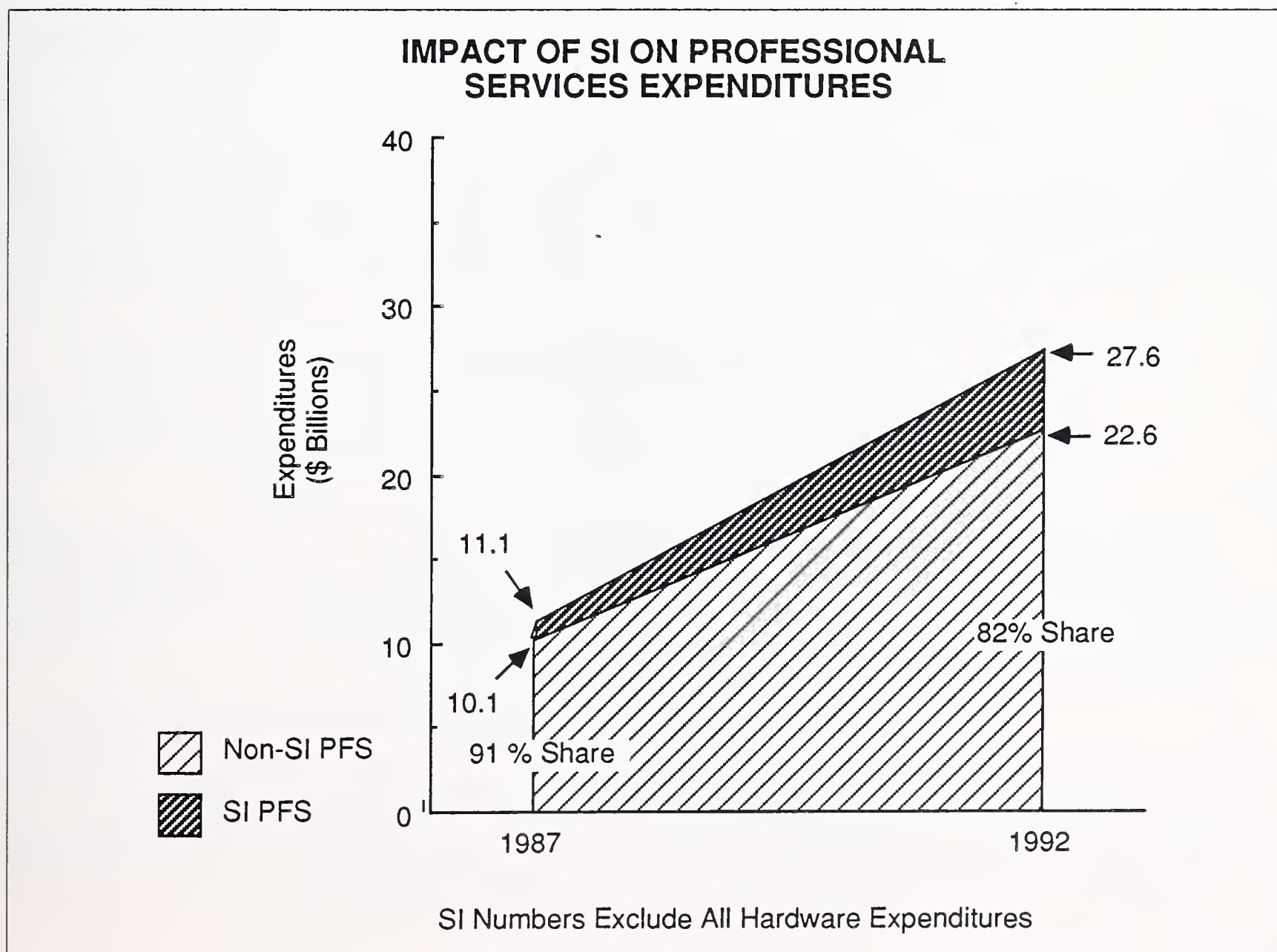
## Executive Overview

### A

#### Impact of SI on Professional Services Expenditures

INPUT forecasts that expenditures through the period of 1987-1992 will result in numerous opportunities for all quality professional services firms, as shown in Exhibit II-1.

EXHIBIT II-1





The "traditional" (i.e., non-systems-integration professional services) services market will grow at an 18% average annual growth rate (AAGR) to \$22.6 billion, while the systems integration (SI) market advances at a 38% AAGR to \$5.0 billion.

There will be room for providers of single services, full service vendors, and systems integrators. In fact, indications are that the commercial systems integration market for professional services will represent only 19% of the total market in 1987. And, if some of this market share returns to non-systems integrators in the form of third-party suppliers, the financial impact will be even less.

However, the non-financial impact created by SI may be more severe. Integrators will work at the heart of the largest firms in the country, thereby attaining a significant influence over the information resource. Non-SIs will need to work harder to enter the corporate boardroom and will likely find the integrator presenting a strategic information plan when the integrator does get there.

Perhaps more critical, integrators, by the very nature of their work, will dictate much of the information infrastructure of the buyer organization. Non-SIs will need to be sensitive to and flexible enough to adapt to this architecture.

## B

### Impact of SI on Professional Services by Service Mode

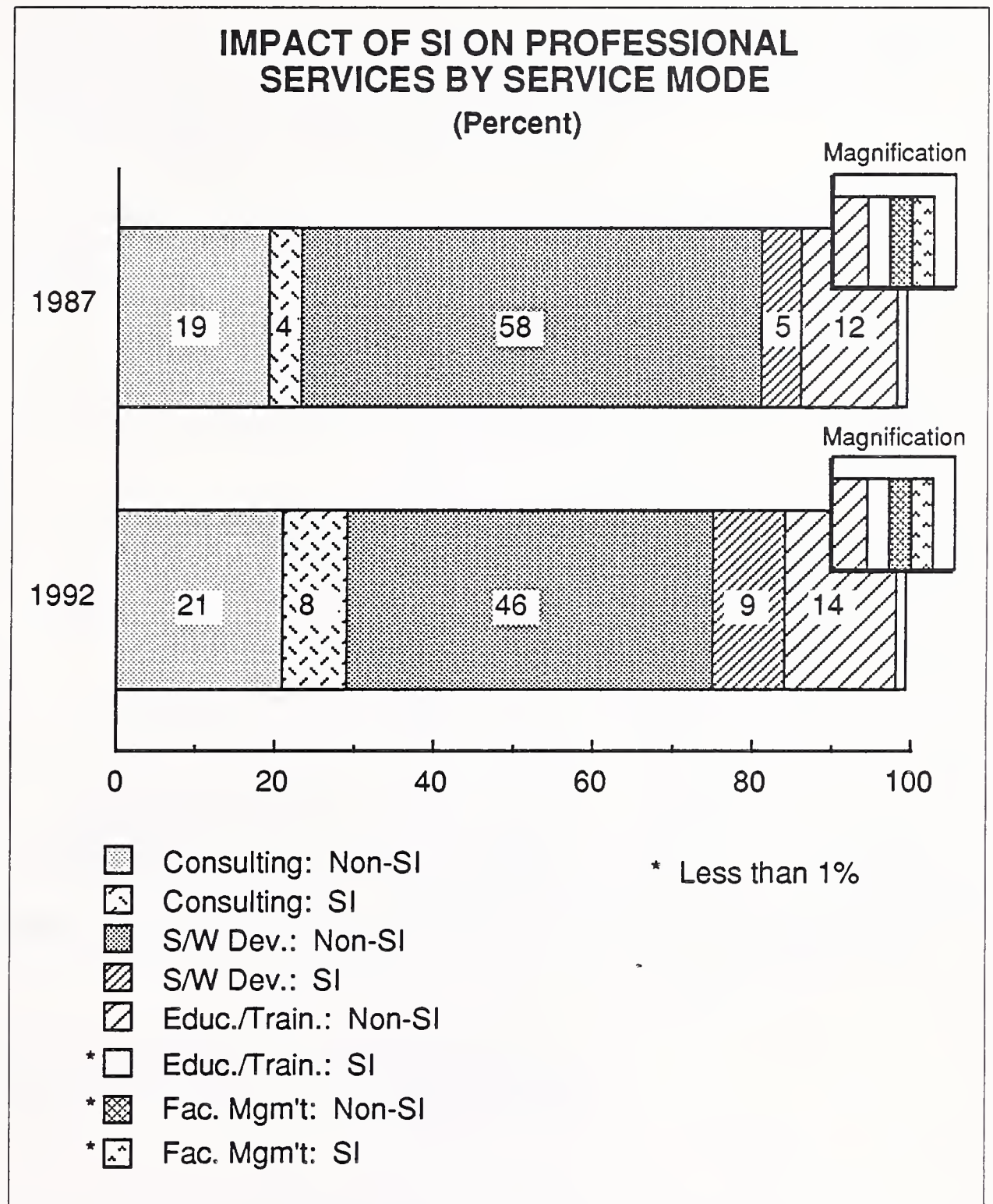
By service mode, as depicted in Exhibit II-2, the largest financial impact will be in the bread and butter of most professional services firms, software development. Outside the SI market, software development will grow at a 14% rate, while within SI projects, the growth will be 37%.

The other point of impact, although the dollar size will make for a smaller hit, is facilities management. Again, INPUT predicts small growth (14% AAGR) in non-SI facilities management but 40% growth in SI markets. The reasoning is that many SI buyers will prefer to engage the same contractor to build and operate the new system.

Education and training services will show nice growth for both markets: 23% for traditional and 39% for SI. In both cases the need will be spurred by the inability to find and retain qualified technical staff. This, of course, will be a key issue for providers as well.

Consulting, the final service mode, will be healthy for both markets as well: 23% for traditional and 38% for SI. Structural changes in this mode may occur as the result of changing buyer requirements. The focus will more often be on process change as the result of the merger of business needs and support technology. Traditional technical consulting void of any specific business application will give ground for the need to ensure that technology is properly and effectively applied.

EXHIBIT II-2



## C

### Service Buyer Requirements vs. Type of Service Offerings

Providers have approached the market from many different service positions. As seen in Exhibit II-3, these positions may not all be appropriate for reaching the largest audience with the right services. Each type of vendor will have competitive advantages over the other types, depending on buyer requirements. The trick will be to ferret out buyers with which that type of vendor will be in the driver's seat.

For vendors with a breadth of offerings the key will be ensuring a consistency of quality across these offerings. In the highly competitive professional services business it will not be sufficient to simply claim an offering—each offering must be on an equal footing with the competition's.



EXHIBIT II-3

### SERVICE BUYER REQUIREMENTS VS. TYPE OF SERVICE OFFERINGS

Buyer Requirement	Single Service	Full Service	Integrated Service
Integrated Solution	No	Partial	Yes
Cost-Value Congruence	Yes	Vendor Dependent	Vendor Dependent
Limited Vendor Interfaces	No	Yes	Yes
Technical Expertise	Niche Only	Peaks & Valleys	Yes
Business Applications Knowledge	Limited	Generally Limited	Vendor Dependent
Rapid Implementation	Yes	Generally	Yes
Service Orientation	Yes	Yes	Vendor Dependent
High Comfort Level	Local Vendors Only	Vendor Dependent	Vendor Dependent

A solution to expansion while maintaining quality in the service offerings is the use of third parties. Integrators do this as a matter of course and non-SI vendors should consider such a strategy as well.

A buyer consideration above all may be comfort level. Although buyers will never mention this as a selection criterion, they do want to work with vendors with whom they feel personally and professionally comfortable.

## D

### The Evolution of Professional Services

Even as the SI market emerges, there is an evolution of professional services firms taking place. This is a natural event that follows the desire to leverage a position with a customer by meeting more of their needs. By providing this "one-stop shopping," vendors hope to engender this comfortable and competent position.

Whether the professional services vendor plans to be an integrator or not, there is the constant need to expand the breadth and depth of offerings.

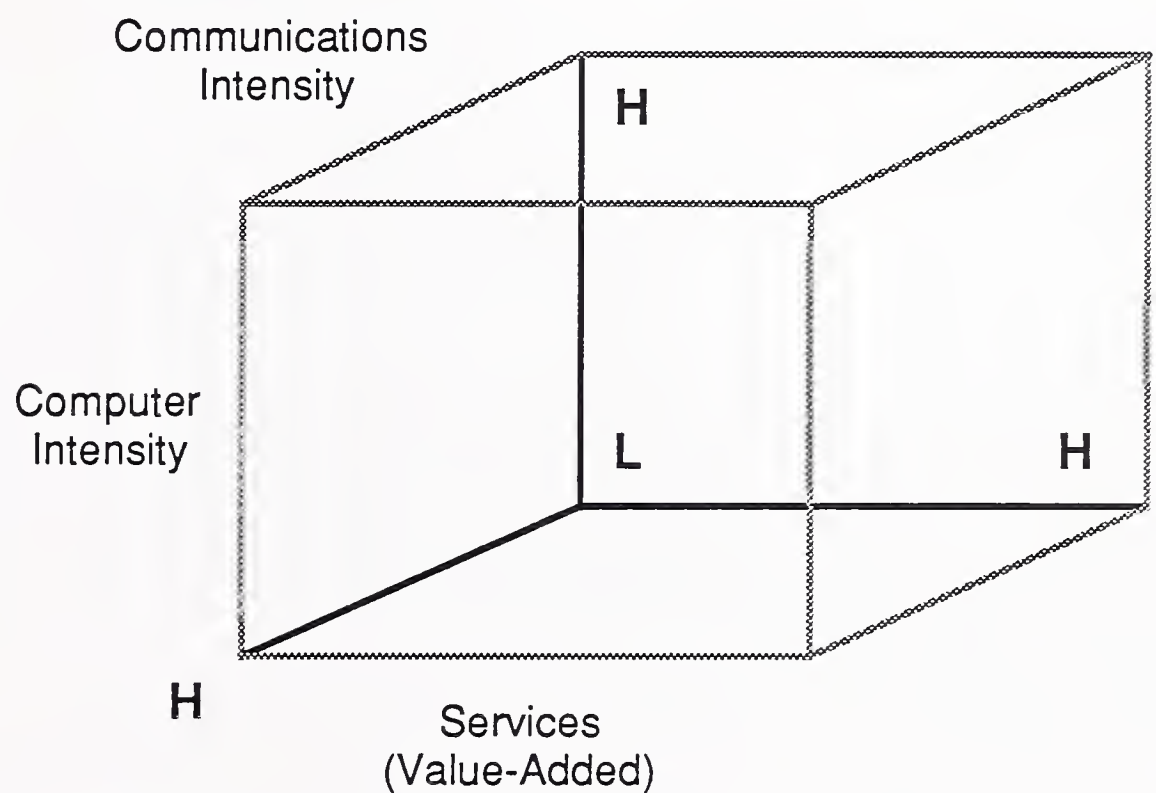


This expansion may take place along any or all of the axes depicted in Exhibit II-4. Providing additional services and/or providing services in a variety of technical environments are the most typical expansion directions.

The SI market affords the opportunity of accomplishing horizontal and vertical expansion at the same time. Any diagonal plane in the cube suggests growth on all three dimensions. The offerings that result from this diagonal growth pattern are exactly what SI buyers are buying.

EXHIBIT II-4

### THE EVOLUTION OF PROFESSIONAL SERVICES



## E

### Recommendations

Professional services firms should, first of all, determine a desired position on each of the three dimensions of the information technology cube. This position should be established only after a careful assessment of the market, the competition, the vendor's current resources, and the vendor's willingness to commit to achieving this position. Exhibit II-5 summarizes the recommendation strategy.

If the position is a niche, the vendor should ensure that the niche is of sufficient size and the company of sufficient strength to make the niche lucrative. Single service firms may want to market their service to systems integrators who will be looking for leading edge expertise in selected disciplines.

## EXHIBIT II-5

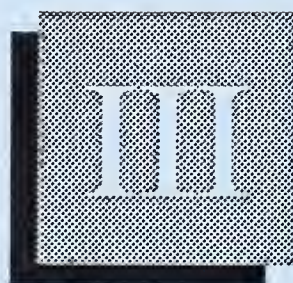
**RECOMMENDATIONS**

- Assess the Market, the Competition, and the Vendor's Resources and Resolve
- Select a Desired Position: Single-Service or Full-Service Integrator
- Develop the Service(s)
- Monitor Progress Continually

Providers who believe their best opportunities are in providing full service should develop or acquire missing service offerings while, at the same time, being careful not to erode the quality or content of current offerings.

When the services are available, either directly in-house or through third-party relationships, the vendor may want to consider the benefits and limitations of SI prime contracting. At this point the decision is not so much whether the vendor can make the required service provisions—that decision should already be in place—but whether the vendor can manage the risks of SI contracting.

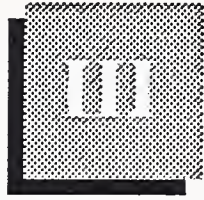
Finally, having planned an approach, the vendor must work the plan. Management's resolve will be tested and the plan, as well as the company, will need to make constant adjustments to account for market changes or execution errors.



# Market Analysis and Forecast







## Market Analysis and Forecast

### A

#### Market Overview

From the vendors' view, commercial systems integration (CSI) involves responsibility for the provision of a "total solution" to a complex, multidisciplinary, information systems requirement. In the typical CSI project the integrator provides, either directly or through third-parties, end-to-end services such as systems design; hardware and software selection, modification, and/or development; installation and testing; training and documentation; and other services that may be required for the solution.

This market, born partially out of the confusion surrounding technological advances, has unique characteristics that demand understanding and response for participants and nonparticipants alike. However, CSI is also the result of the natural evolution of information services vendors and, as such, shares commonalities with "traditional" services.

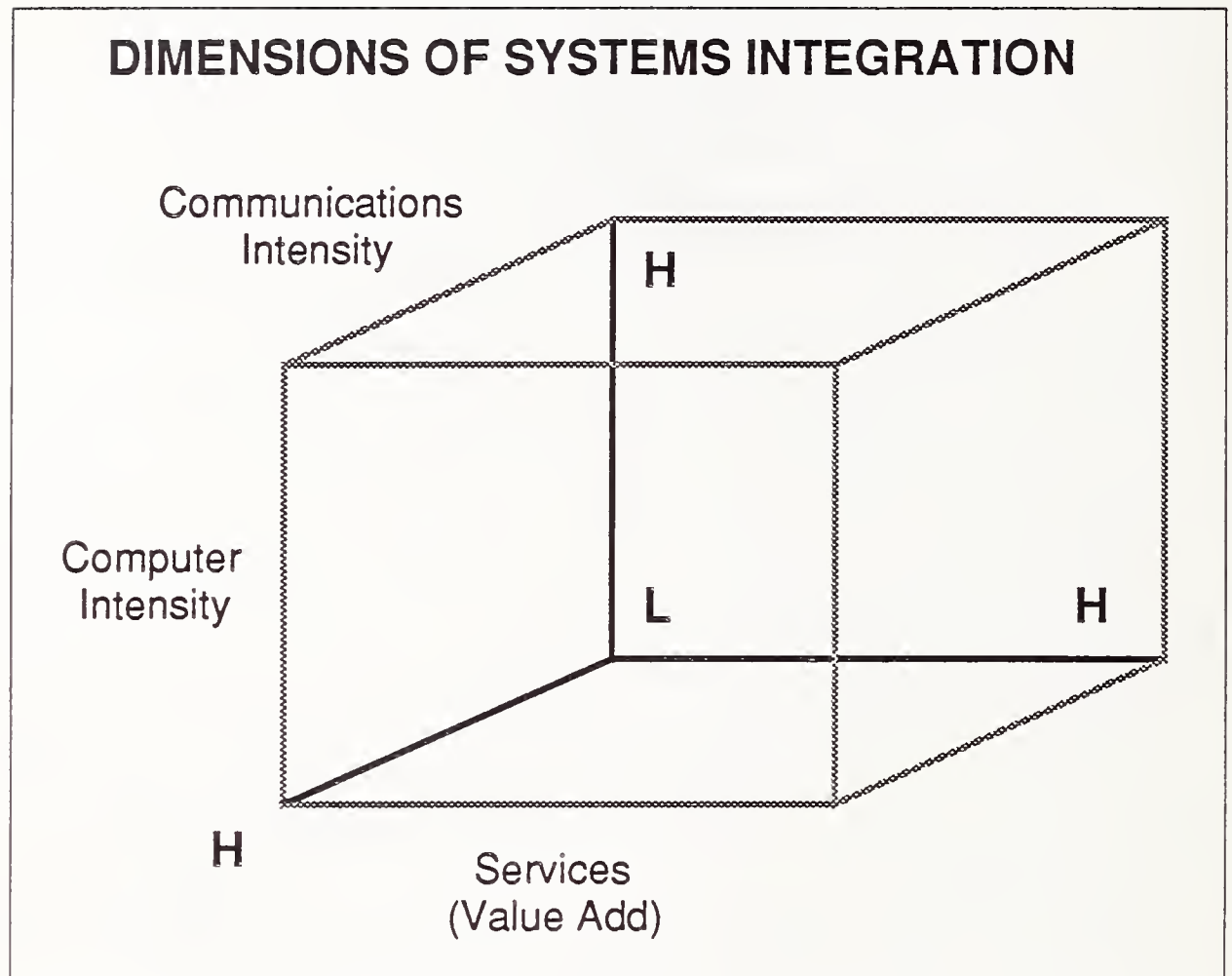
The characteristics that combine to form the market structure influence, even dictate, some of the strategies non-SI professional services vendors adopt.

#### 1. Structure of the Market

As is depicted in Exhibit III-1, any given CSI project usually includes the three dimensions of the information systems/services building block. And, for the most part, CSI components are concentrated at the higher, more sophisticated ends of each continuum of the cube. The market structure is such that concentration is on the value-added aspects of each dimension rather than the single, standalone, "commodity-type" offerings included in each dimension.

To be sure, any given CSI project may only encompass products/services on one or more dimensions, but it is the multidimensional aspects that make these projects truly unique.

EXHIBIT III-1



a. User Requirements...What Are They and Who Has Them?

Although the characteristics of buyers of SI approaches to project development versus those of non-SI buyers have yet to offer reliable discriminators, the emerging trends do provide an indication of the changing structure of the information systems/services market, as shown in Exhibit III-2.

The dollar size and strategic importance of major systems development projects generally warrant the oversight at the highest executive levels of the buyer's corporation. As with other, smaller efforts, end users and DP/MIS personnel will likely be involved, but the buying decisions tend to be made at a level higher than typically required for standalone services.

One reason that senior executives are involved relates to the closeness of the information resource to the heart of the business. Although the non-SI buyer may have strategic-level needs, the SI buyer's requirements relate to "mission critical" systems. Or, in some cases, the importance is placed not so much on the application as it is on the desire to realize the benefits of the information resource investment. Executives are anxious for long-term cost savings, not only through reduction of duplicity and the increase of information leverage, but also from relief of the burden of obsolete systems that are hard to use and hard to maintain.

## EXHIBIT III-2

**NON-SI AND SI BUYER CHARACTERISTICS**

Characteristic	Non-SI Buyer	SI Buyer
Corporate Level	End User - DP/MIS	Executive
Importance of Info. Resource	Limited	Critical
Urgency of the Need	Timely	Critical
Availability of In-House Staff	Limited	Limited
Capabilities of In-House Staff	May Be Limited	Unqualified
Multivendor Environment	Sometimes	Frequent
DP/MIS Management "Style"	Parochial	Flexible
Previous Vendor Experiences	Mixed	Positives

The urgency of the effort as perceived by the buyer depends on such external pressures as competition, desire to attract capital, or concerns over shareholder value. When buyers are ready to employ an integrator, generally the need is urgent.

The availability of the in-house staff is a factor in both SI and non-SI buys, but it may not be a discriminating one. In both cases, there may be a desire to cover the shortfall in personnel that is created by the sheer lack of staff in the organization or the staff's deployment to operations and maintenance of existing systems in the organization.

The capabilities of the in-house staff with respect to the systems requirements may be a different story. Generally, the SI buyer believes these are unique, or at least complex, problems that require technologically sophisticated solutions. The current staff, mired in patching obsolete systems, may not have the vision and expertise in some of the disciplines required in the solution.



One situation where this lack of expertise is common is multivendor environments, which are typical in SI projects. The previous piecemeal approaches to solutions have left the customer without the integrated information systems infrastructure. The anticipated SI effort may have a requirement to develop such an architecture.

Such a desire frequently requires that the DP/MIS executive have an open, flexible style that will allow the admission of problems and the seeking of outside help in solving them. Some DP/MIS executives have such a parochial view that they are unwilling to relinquish any amount of control for the development effort. With this style the selection of an SI approach by the DP/MIS executive is unlikely.

Part of this perception comes from previous experiences with vendors. Few, if any, SI projects are contracted if the organization has had negative experiences in the past. In these cases, the buyer would rather control the entire project and seek help for well defined and reasonably scoped component parts.

#### b. What Are the Types of Needs?

The complexity of information technology requirements increases not only as a result of competitive pressures but also with advances in the technology itself. Distributed processing, multinode data bases, communications using ISDN capabilities, IBM's SAA, and near-constant software updates that take advantage of this changing environment are but some of the technology drivers.

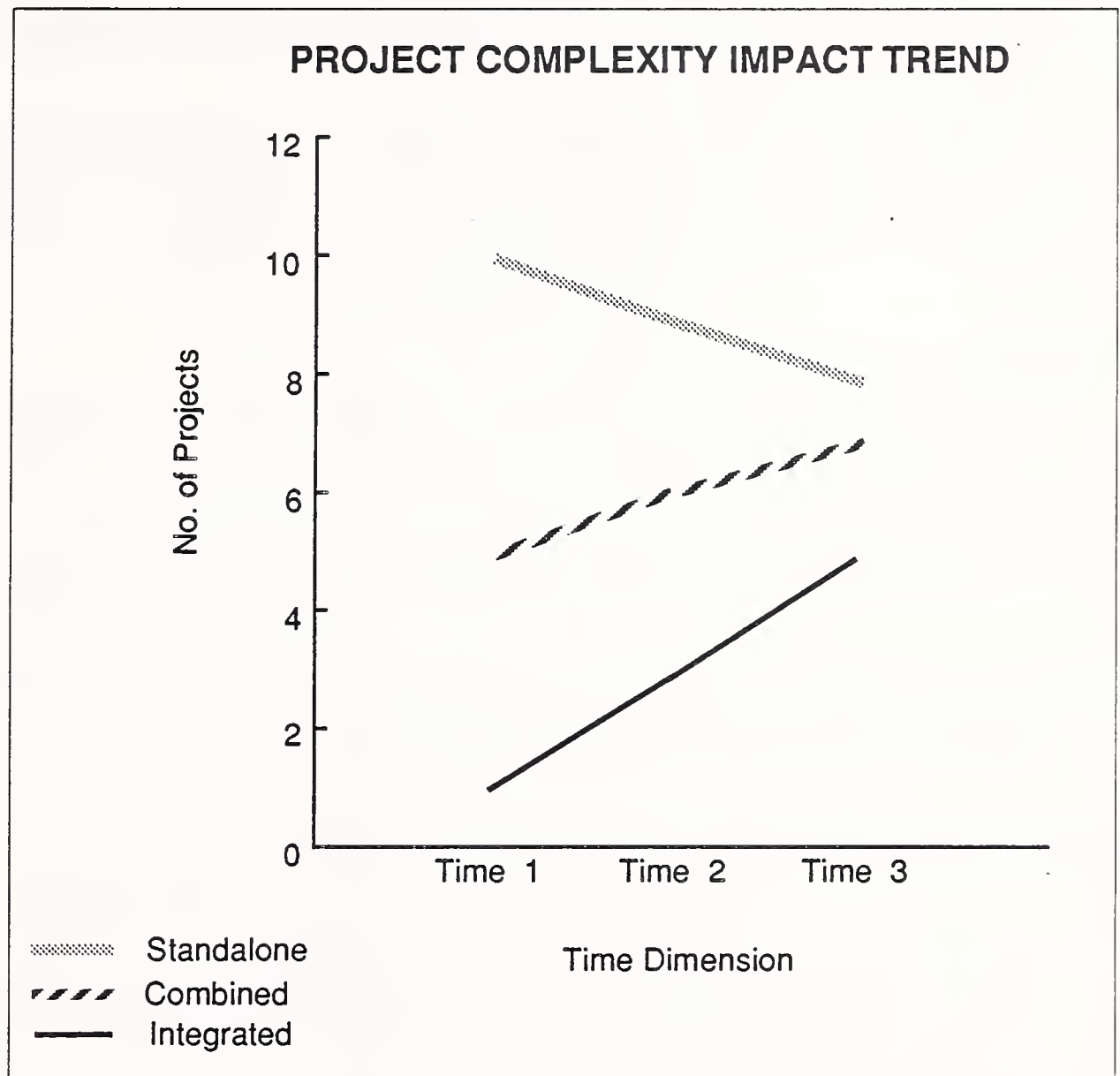
As a result, the isolated, standalone effort of the past that requires the supply of a single professional service is giving way to multiple, sometimes complex, services. As depicted in the model in Exhibit III-3, requirements for standalone services (software development, or consulting, or education/training, or facilities management) are being combined into multiple-service requirements and, at an even faster rate, integrated service requirements.

Listed below are several specific examples of user needs that demand more-complex, multiple services.

Buyer values are changing to distributed technology in response to competition and internal requirements. The demand is to move technology close to the worker while maintaining control over the corporate information resource. Projects that move the company in this direction may also be complicated by the desire to keep the status quo and innovate at the same time.



EXHIBIT III-3



Corporate America also requires the integration of information resources through the development of an information system infrastructure rather than the piecemeal approaches to problems of the past. The complexity here is obvious.

To avoid the close-ended systems of today buyers are also requiring the development of flexible, upgradeable systems. There is a growing emphasis on standards (e.g, UNIX, ISO, MS-DOS, Ethernet) and a customer expectation that, since these are standards, the components should work together.

As further assurance of "open systems," buyers are asking vendors to provide technology oversight that keeps them constantly updated on available technology. Today's professional services must not only involve the application of current technology but also expertise in how current technology will migrate to future technology.

c. How These Factors Argue for and against Non-SI Vendors—The Buyers' Perspective

Exhibit III-4 suggests some of the current buyer values when considering competitive professional services firms. As one might suppose, the forces cited above prompt buyers to want it all. While "ALL" is not a realistic—or profitable—offering, this list may be a success factor rating list for SIs and non-SIs alike.

EXHIBIT III-4



By combining several smaller projects into a major effort, buyers hope to achieve the overall integration they desire and, at the same time, avoid some of the costly duplication involved in completing these smaller projects linearly. In these integrated efforts buyers require a broad spectrum of skills and service offerings.

To be sure, some customers want hardware and services unbundled: the right hardware, without vendor bias, at the lowest possible price. And, unrelated to the hardware, customers want the technical services expertise to design and implement a solution unconstrained by the type of hardware system. But, whether the solution components are bundled or not, the buyer expects there to be a cost-value congruence. That is, the vendor(s) must be competitive on price and quality; each of these must be in line with what the buyer expects to pay and receive. The price quote need not be the lowest, but it must be close to those that are lower. Similarly, few buyers are willing to pay a premium for the highest quality.

SI offers a belief that, unlike their own track record, major projects can be successfully completed by a vendor or team of vendors with the wherewithal to amass the resources required. The buyers' hope is that by limiting the number of vendor interfaces they will be able to achieve a rapid, cost-effective implementation. The vendor(s), then, must demonstrate a range of technical skills and applications and industry experiences as well as project management skills that will ensure effective management of the resources to be utilized.

Buyers also hope that by undertaking major projects through an SI approach, a successful partnership between the buyer and vendors(s) will develop that will foster technologically progressive solutions. The bottom-line hope is that this partnership in technology will not only help the buyers learn how to do it themselves, but also help to avoid the closed-ended, inflexible systems that have too often resulted from previous development efforts.

Above all, buyers want to feel comfortable with the vendor(s) and want to feel that the team offers the opportunity for the right people doing the right jobs at the right time.

The impacts of these buyer requirements on non-SI vendors are illustrated in Exhibit III-5.

EXHIBIT III-5

### HOW BUYER REQUIREMENTS IMPACT NON-SI VENDORS

Buyer Requirements	Impact on Non-SI Versus SI Vendor
Integrated Solution	Integrate Components Only
Cost-Value Congruence	May Be Very Competitive
Limited Vendor Interfaces	Multiple Interfaces
Technical Expertise	Niches Only
Business Applications Knowledge	Niches Only
Rapid Implementation	Depends on Available Vendor Resources
Service Orientation	May Be Very Competitive
High Vendor Comfort Level	Depends on Previous Experience with Vendor



Although non-SIs may not be able to be all things to all buyers, they do have key advantages in terms of price/performance: the ability to be leading experts in narrowly defined niches, and the ability to personalize the buyer-vendor relationship. These may be key elements to success in the current buyer market, especially if non-SI vendors carefully target their prospects.

The whole buyer world has not embraced the SI buyer requirements noted above. But when/why would a buyer want a non-SI vendor? What are these targets? What are their general characteristics?

A prominent phenomenon is those who can't or won't turn over control of an effort to an outside organization. These buyers may have their own inflexible approaches that have no room for alternative views offered by vendors, but, more typically, the issue is one of risk management. Buyers of non-SI services realize that although SI approaches purport to share risk, the ultimate business responsibility for any new system remains with the buyer. SI contracts may include project failure remediation clauses, but the buyer, not the vendor, must be accountable to his/her management for delays, cost overruns, or lost business. For conservative, non-risk-taking buyers, the best approach is to maintain extensive control over the project resources.

Although buyers are willing to recognize a mass constructed of multiple sources, buyers are concerned that the project management string that holds it together may come unraveled—during the project and in the face of the buyer.

A sound approach to meeting these needs is to supplement in-house staff with outside resources. Rather than being a different entity, these resources become an integral part of the buyer's staff under full control of the buyer. "Bodies" or specific technical expertise may be acquired only for the period of need. And, by unbundling the components of the solution, the buyer may be able to find the best source of each component rather than accept the weaker links that are bundled in with "total solutions."

## 2. Vendors' Current Offerings

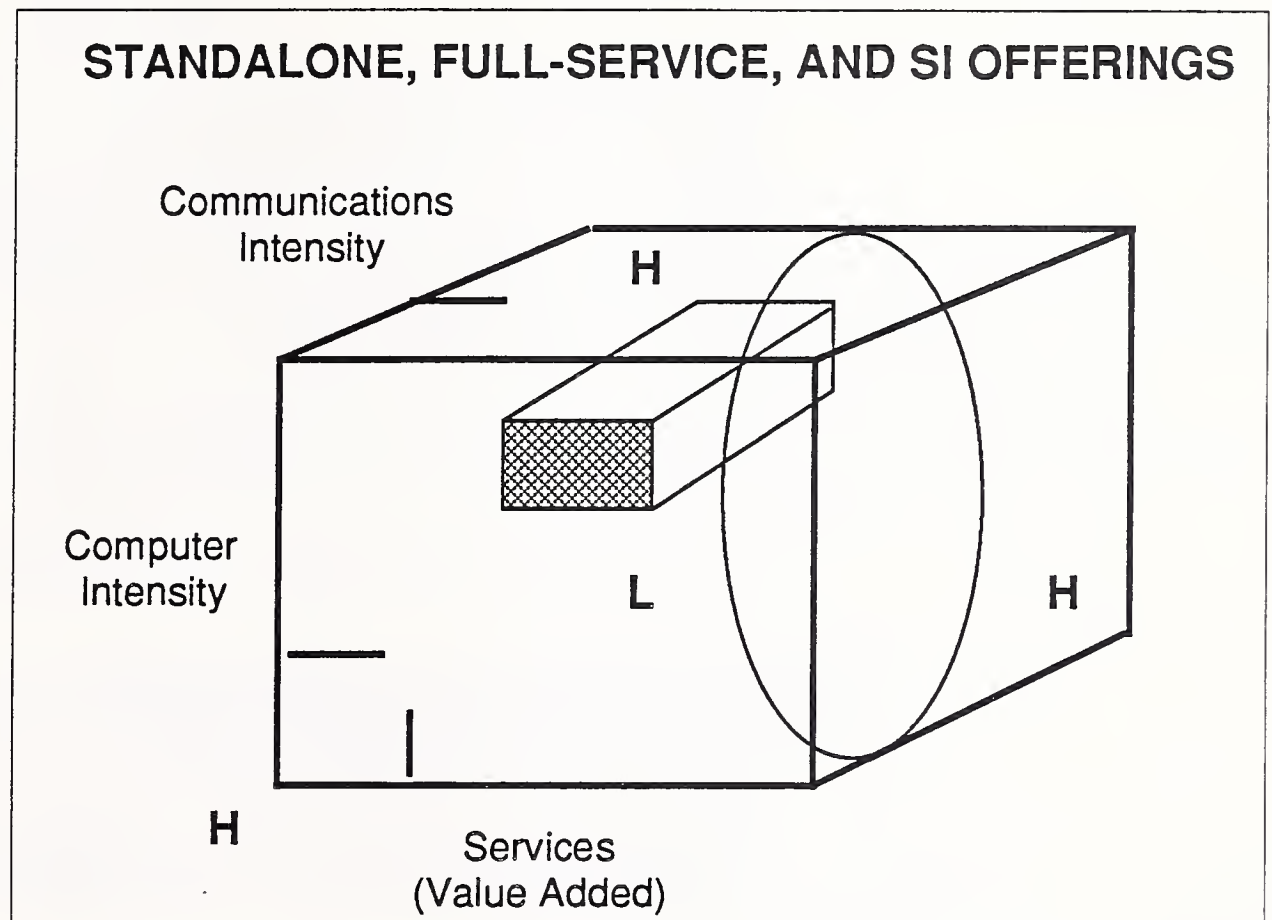
Vendors that address the market as described above may be broadly classified into three groups: single-service providers, full-service providers, and "true" systems integrators. The divisions among the groups include a considerable amount of gray area due, in part, to the natural evolution of professional services firms.

Most firms start business as providers of a discrete service (e.g., software development, systems engineering, hardware selection, education/training, documentation, facilities management, etc.). This single service



offering is depicted in Exhibit III-6 as a single line. (Single lines are also depicted for firms rooted in computers and communications.)

EXHIBIT III-6



As the company grows, the discrete service is developed vertically (e.g., deeper, richer skills) and/or horizontally (e.g., broader application of the service to other industries). Each Line of Business (LOB) is a discrete part of the systems life cycle and each is a seedbed for technology that is applied to SI, but, individually, no LOB provides the full array of services needed for SI.

Depending on the company's ability to invest in the discrete line of business (LOB), the company may move both vertically and horizontally. CSC, for example, has a software development LOB, communications engineering LOB, and operations & maintenance support (FM, computer operations, site support) LOB. Two and/or three dimensions of the vendor's offerings take shape as the services are related to either or both computer and communications technologies.

At this point in professional services firms' evolution, they are able to offer a complete spectrum of services as depicted by the solid rectangle within the cube of Exhibit III-6.

Some industry pundits think that these traditional professional services are obsolete. They argue that customers demand vendors that are on top of technology, that have experience in applying this technology, and can help the customer take advantage of technology for competitive advan-

tage. "SI is the professional services business of tomorrow." The argument of this report is that the offerings of professional service(s) firms will continue to be in demand.

As a third and final category of professional service firm, these services are tied together with project management and offered as systems integration. SI is depicted in Exhibit III-6 as an oval combining the higher levels of value-added services and computer and communications intensity. One additional way to view SI vs. discrete professional services is that the former involves strategic, applications-based solutions while the latter is more tactical in nature.

A range of services glued together by project management does not a systems integrator make. Additional investments are required in:

- R&D to stay on the leading edge of technology (i.e., software productivity, Ada language, expert systems, etc.)
- Proprietary tools (e.g., network analysis, CPU utilization) and methodologies (from requirements through development incrementally checking progress and schedules against cost and functionality factors) to help the vendor manage projects. Large companies need a tools information center to make these tools and methodologies accessible to SI program managers.
- Laboratories (for such things as software technology, logistics, networks, office systems, etc.) to bring third-party technology to SI solutions.
- Extensive staff training in project management.
- Ability to leverage all corporate resources to understand and apply technology, and to understand the buyer's business.

There are points where the buyers' needs and vendor offerings are not in synchronization. These are additional points where providers of discrete services may find opportunities.

Buyers believe their problems are unique and would prefer unique solutions at a packaged price. This is not possible, of course, and so vendors are offering "customized" packages. Counter to this, however, is the fear that the buyer will have a "unique" solution developed only to find it commercially available later.

Buyers perceive integrators to have methods for successful project processes, but the tools and methods for project management are just now coming on stream for SI vendors.

Buyers believe that vendor alliances engender the “best” solution, but vendors typically have a “we can do it all” mentality and only the nonexistent or very weak links in the life cycle chain are covered by third-party relationships.

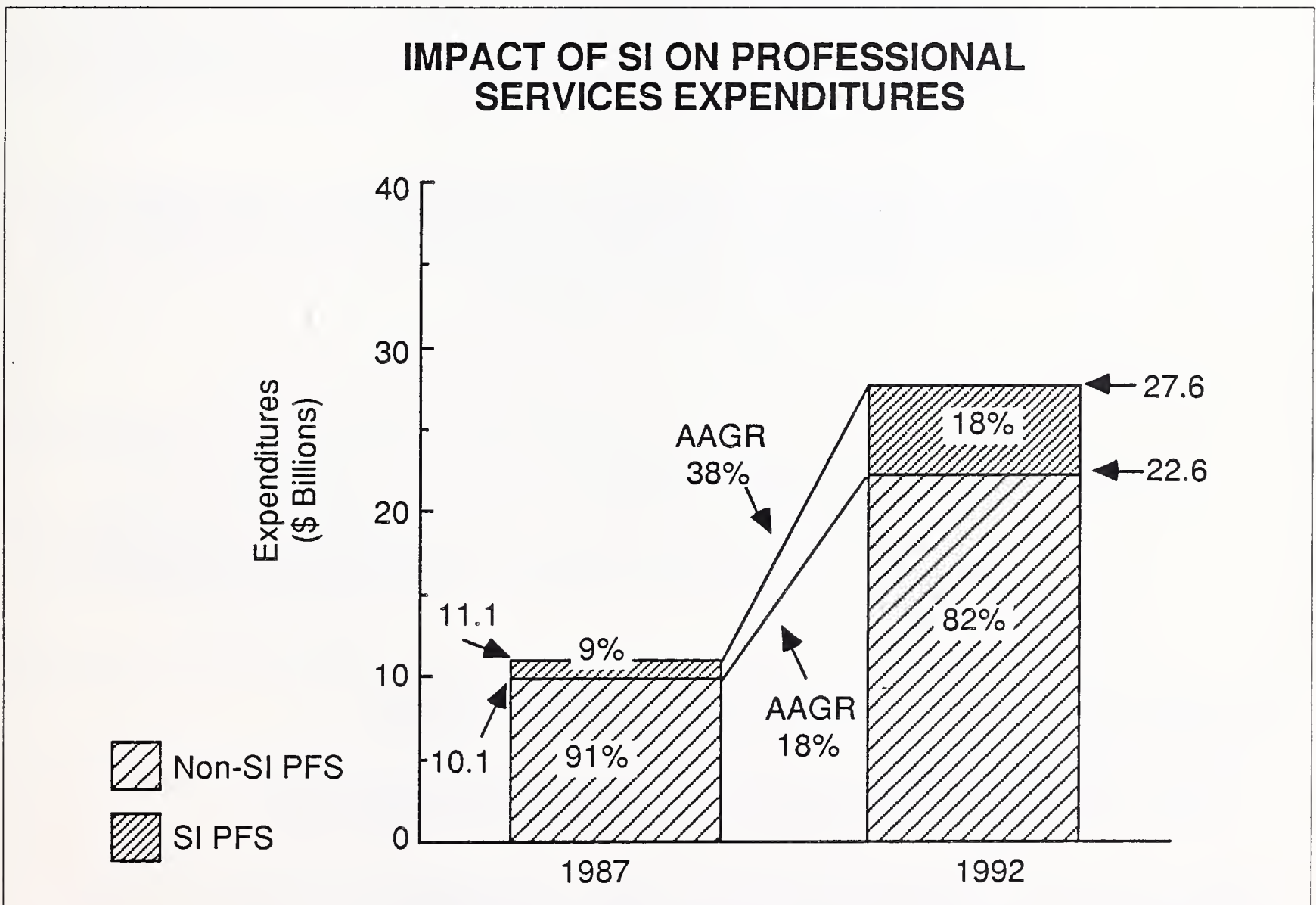
## B

### Market Forecast

#### 1. Total Professional Services

INPUT's 1987-1992 forecast for professional services is depicted in Exhibit III-7. Overall, INPUT projects that SI-related services expenditures will move from a 9% share of the services market in 1987 to a 19% share by 1992. Said another way, some \$5.0 billion of the services market expenditures will be under the control of systems integrators by 1992. This represents a 38% average annual growth rate (AAGR) for SI compared to 18% for discrete professional services.

EXHIBIT III-7



It is important to note that these SI-controlled expenditures may not all go to integrators in that third-party professional services firms may be hired as subcontractors to provide some of these services. In a worst-case scenario, however, SI-type projects could erode some \$5.1 billion from



The forecast was validated by the vendor interviews conducted for this report. Although the interviewees understood the SI concept—some even purporting to provide SI services—no vendor reported a negative financial impact because of it.

The sheer size of the non-SI market, at \$10.1 billion in 1987 expenditures, seems to provide ample opportunities to professional services firms outside of SI approaches. Some interviewees did indicate that they were providing components for larger, SI-type projects where the ultimate responsibility was with the in-house organization.

Other vendors may work far from the center of any SI activity at a buyer organization in that the point of contact is not corporate-level, but end-user-level in a specific line department or regional office.

Visions of the future impact are not so certain for non-SIs. Media visibility and aggressive forecasts provide a concern that is not so much financial as related to account control. It is the desire of every sales organization to push for higher-level sales contacts, and vendors making this push fear being preempted by very large vendors (who may or may not be systems integrators).

Except for the very narrowly defined niche vendors, there seems to be a feeling for the need to provide additional services that play to the “one-stop shopping” desire of the buyer and, at the same time, leverage the vendor’s long-standing customer base.

## 2. Professional Services by Mode and Type of Vendor

Where will the impact of SI be the hardest? As depicted in Exhibit III-8, each discrete professional service category will be impacted:

Non-SI consulting services, with current expenditures totaling 83% of the market for these services, will find an additional 10% under the SI umbrella by 1992.

With large software development efforts included in SI-type projects, this service will also see a 10% share adjustment.

Education/training, on the other hand, will be in demand as a standalone service and show minimal influence from SI projects.

Finally, facilities management will experience the most dramatic share change, from 87% non-SI in 1987 to 71% non-SI by 1992, as buyers reason that the vendor(s) that built the solution should also run it.

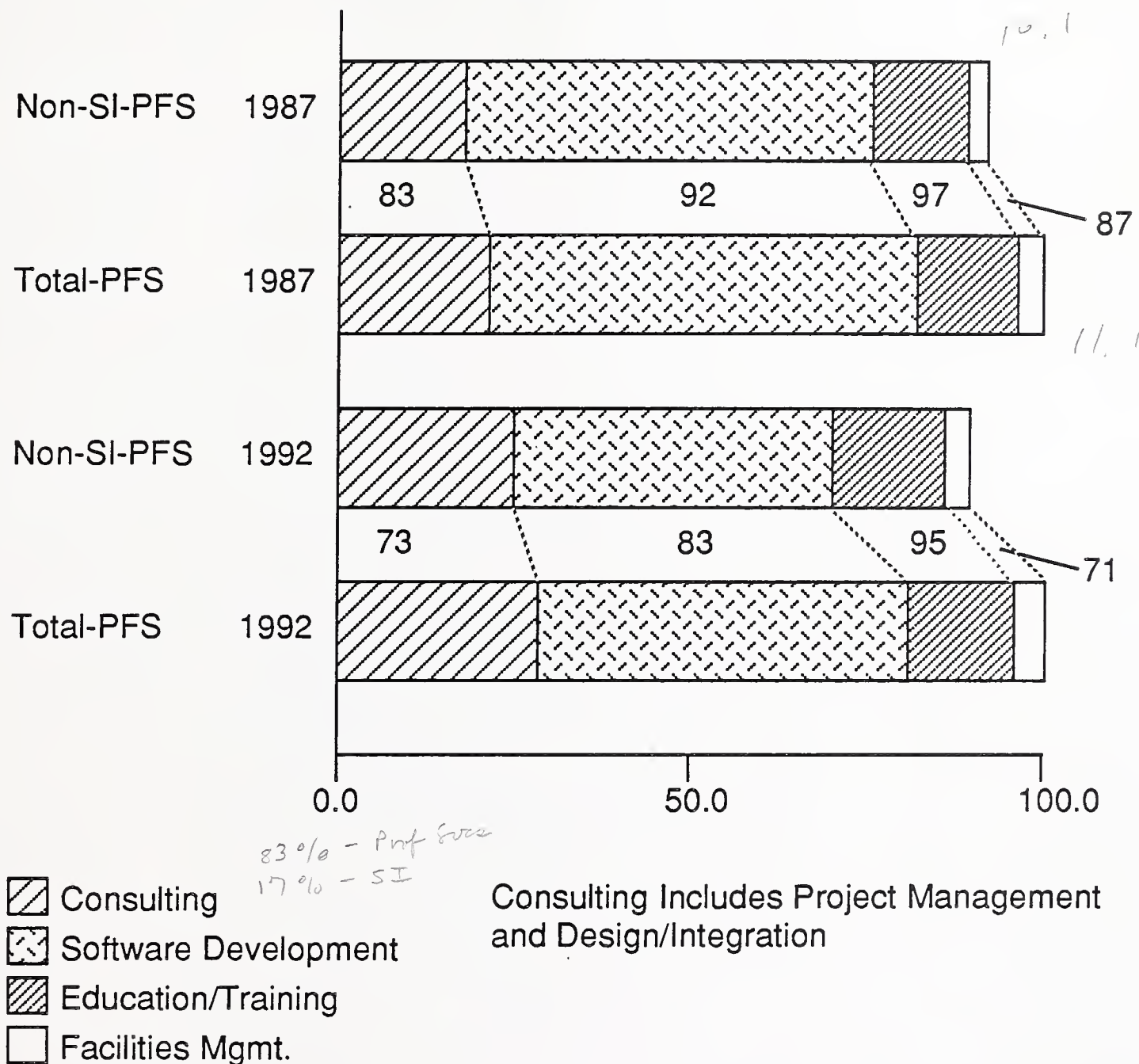
Vendors that demonstrate specialty expertise (e.g., optical storage technology, artificial intelligence/expert systems, multimedia training, office of the future, etc.) may observe little impact since these niches are



CONS

EXHIBIT III-8

### IMPACT OF SI BY SERVICE MODE (Percent)



unlikely to be significant targets for large SI vendors. On the other hand, the “plain vanilla” vendors that offer “bodies” or run-of-the-mill skills may be impacted by SIs or professional services specialists. In the worst case, these “commodities” will come under increased price pressure.

The bottom line is that a large, rapidly growing market for professional services will lessen the impact of the SI expenditures on non-SIs. However, changes in buyer requirements, some of which are SI-related, will have an impact on how professional services vendors run their businesses. All of these impacts are discussed in the next section.



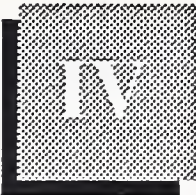


# The Professional Services Competitive Environment









# The Professional Services Competitive Environment

A

Competitive Forces

From the vendors’ perspective, the emergence of systems integration as a full-fledged market requires a careful analysis of each vendor’s offensive and defensive strategies toward the competition for professional services. The reasons vendors may choose to pursue the SI market (the offensive strategies) and the compelling forces that may not allow them not to pursue it (the defensive strategies) are discussed below. Exhibit IV-1 summarizes these various issues and strategies.

EXHIBIT IV-1

COMPELLING FORCES IN THE SI MARKETPLACE

Driving Force	Offensive Strategy	Defensive Strategy
SI Contract Expenditures	Increase Revenue	Maintain Share
SI "Add-On" Expenditures	Develop Stable, Continuing Revenue	Position as "Favored" Vendor
Account Control	Capture Control	Deny Control
Third-Party Distribution	Control Channel	Define Channel
Need for More Horizontal Orientation	Develop on the Diagonal	Protect Vertical Presense
Increase Shareholder Value	Risk Assumption, Visibility	N/A

The attraction of SI, first and foremost, is anticipated contract expenditures. SI contracts tend to be large in dollar value and multiyear in execution, providing an attractive, stable stream of revenue for multiple years.

Part of the expenditures are “simply” from the value-added premium associated with SI projects. Simply stated, the assumption of risk may mean the difference between a \$500/day programmer and a \$1500 per-day one. For self-assured vendors with a track record of risk management, the additional dollars available with the SI label may far offset the downside if the project goes bad. Many vendors see this premium as payment for something they have been doing all along—managing tasks, projects, or even programs.

An interesting byproduct of risk assumption may be increased market value for the vendor from the investment community. SI contractors are changing perceptions from the “body shop” to highly regarded integrators who work at the intersection of technology and its application. The recent spate of well-received consolidations (via merger and acquisition) as a means of handling increased capital intensity (development facilities, training, etc.) attests to these changing perceptions.

Another expenditure opportunity is the service “door” for selling products. By leading with service, not the product, vendors are finding their own analogy to the statement, “People buy holes, not drill bits.” The information services industry is turning from a vertical orientation (e.g., hardware, software, or services) to a horizontal one. To survive, vendors must be both a product and a service company. Professional services vendors, (e.g., Computer Task Group, American Management Systems and Computer Horizons) are now providing products, and product producers (e.g., IBM, Digital Equipment, Software AG, etc.) are providing services. SI provides the perfect opportunity to move to a horizontal opportunity via a diagonal direction.

In both cases, these events lead vendors to be integrators. Their efforts are rewarded due to the better margins in software and services, not computer hardware.

Finally, the dollar expenditures are attractive for the “default” opportunities, or add-ons, that are frequent.

Since the SI vendor knows so much about the buyer’s business and support systems, it is only logical that the SI vendor become the vendor of choice on other, unrelated projects. These add-ons may be as much as 2-3 times the size of the original SI contract.



Each SI contract has the potential for enhancing a long-term relationship with the client through close working and constant communications, and through the need to develop the vendor's understanding of the business. The prime SI vendor may become the "favored" vendor and influence, even decide, what other vendors should be involved in this, or future projects. No vendor wants to hear that it has been pre-empted and that another vendor has account control. SI projects thereby become a very large distribution "funnel." The integrator's role is to set a standard architecture. If "another" vendor is setting it, the next vendor may have to follow someone else's standard.

Even without SI, there is more and better competition today. This changing competitive structure requires vendors to offer a range of services required by the buyer. The number of nontraditional entrants (e.g., the RBOCs, management consulting firms, software product producers, etc.) attests to the need for horizontal expansion of offerings.

The dollar size and criticality of most SI projects puts the vendor in contact with the highest levels of the buying corporation. The SI vendor may have some influence over corporate-level issues as opposed to data-processing-oriented ones. To maximize the selling influence, every vendor wants access to the executive suite. The SI vendor may more readily get that access and visibility, making SI a means of getting close and staying close to the customer base.

## B

### The Liabilities of SI Contracting

The above reasons are all quite attractive reasons for becoming a systems integrator and, given these attractions and the market structure as discussed in Section III, some industry watchers believe the issue is not whether the professional vendor should become an integrator, but who will be most successful in investing in and executing a strategy. INPUT does not believe the decision is this "simple," but prefers to hold the notion that services vendors should know and weigh the liabilities as well.

First, the SI business requires organizational changes that are neither easy nor inexpensive. Some of these organizational imperatives are discussed below. Also see Exhibit IV-2.

SI requires a full range of product knowledge (not only hardware and systems software, but also applications and services). Vendors must solve the key problem of how to migrate from software technology skills to a set of industry and applications skills. SIs are typically required to have a business sense and business understanding. Not all vendor staff, especially those immersed in technology, will have or be able to readily acquire these sensitivities.



## EXHIBIT IV-2

**SI BUSINESS DEVELOPMENT  
CONSIDERATIONS**

- Structural Changes
- Risk Assumption
- Range of Product/Service Offerings
- Proprietary Products/Services
- Applications/Industry Expertise
- Skill Sets

To be most successful, SI requires vendors to have both product and services offerings. Investments may need to be made in developing proprietary products or in establishing relationships with product providers. These products may include applications (e.g., IBM-Hogan banking products, M-Tech's acquisition by EDS for M-Tech's expertise in the financial services industry, etc.) or development tools and starter code such as those available through, for example, AMS and CTG.

Although most traditional professional services firms have developed into a network of quasi-independent regional offices, SI demands some corporate overhead functions. This centralized skill mix will include many support functions such as proposal developers, contract managers, technical architecture planners, second- and third-party supply support, education/training specialists, documentation experts, and the like. All of these skills represent additional investments.

As mentioned above, a different set of selling skills may be required. The target customer is changing as mission-critical systems become the focus. This requires an ability to approach and sell the "real" buyer, the chief executive. Add to this the fact that, in commercial markets excepting state & local government, RFPs are let on a prequalified basis. This requires a considerable investment in finding the potential opportunity and selling the buyer on the vendor's ability long before the RFP even appears.

Vendor-vendor relationship building to line up third-party suppliers takes time and money. And, like most of the above, these relationships must be set up before the specific opportunity arises since the short RFP response period usually does not permit time for these activities.

Perhaps the hardest structural change involves risk assumption and risk management. The preaward investment cycle is long and costly. Post-award, some vendors are required to play “bet your company” with steep performance guarantees on complex one-of-a-kind development efforts. Although perceived value premiums may offset some of the risks, vendors must also have some critical mass to achieve the margins desired.

Other skills and abilities that may be required include:

A project management methodology and experience in managing the risks of major projects. The methodology must include standards and tools that enable the proper creation of requirements definition, project control from design to operation, management of costs, schedules, and quality. And, staff must have the proper training and experience. SI does not allow for staff to learn skills on customers’ time.

To ensure that the vendor is sufficiently versed in technological advances, a structure for the evaluation of technology should be in place. Advanced technical laboratories, both as customer showcases and as training facilities, are now supported by such traditional vendors as CSC and AMS.

For professional services firms talent defection, always a problem, becomes a critical issue in SI where the buyer expects no staff turnover or, worst case, turnover that is transparent and nondisruptive to the project. This expectation may require creating white-collar technical jobs that are economically and technologically attractive, highly regarded training programs, good recruiting, no layoff policies, and the like. In the age of the “baby bust,” staffing may be a real challenge. CASE-type approaches may offset some of the shortfall, but, even with CASE, there must be an underlying methodology ingrained in each staff member.

Finally, the SI market requires that vendors offer expertise in technical or applications areas. Investments must be made in such disciplines as artificial intelligence, signal processing, etc.

## C

### Competitive Strategies

Given the requirements of the SI market as it is now being structured, INPUT believes that current non-SI professional services vendors have two general strategic options: to be competitive or to be cooperative. Each position is outlined below and summarized in Exhibit IV-3.

#### 1. Fight ‘Em

To achieve or maintain a competitive stance, vendors may find success by adopting one or more of the following positions.

Non-SIs might appeal to buyers with the argument that the vendor’s small size affords better service and ability to understand the buyer’s unique needs, and flexibility in adopting the buyer’s approaches to development.



## EXHIBIT IV-3

**STRATEGIES FOR NON-SI VENDORS**

- Competitive Strategies
  - Use Size to Advantage
  - Highlight Unbiased Position
  - Offer Unique Specialization
  - Develop Full-Service Capabilities
- Risk Assumption
  - Reposition Competitive Strategies
  - Develop Vendor-Vendor Relationships
  - Bring Opportunities to SI Vendor(s)

This strategy plays to buyers' fears of large project failures in that "bite-sized" pieces intuitively offer more assurance of successful completion. Not only does the vendor's small size allow for faster decisions, but also the ability to leverage resources and experiences for cost competitiveness.

Related to this, vendors might argue that the SI vendor, while large and multifaceted, is still a (computer, telecommunications, construction, etc.) vendor at the core.

Although no company can be totally objective since all vendors offer products/services with which they are familiar, the professional services-only vendor may have fewer hidden agendas. Vendors should be careful with this position since 1) it was argued above that a key to SI success is having proprietary products and/or third-party relationships, and 2) each of these vendors, while biased, offers the tradeoff of knowing the technology best since they are the creator.

An alternative position is specialization. Even with their size and where-withal, SI vendors may not be all things to all buyers. Non-SIs might focus on service components that are at the periphery of the core since



the SI strategy is likely to focus on the core of functionality that must have the greatest longevity and endure the most risk.

This specialization might be a unique industry or applications expertise. By careful positioning on a technology user-creator continuum, vendors may meet buyers' desire for vendors who implement technology and also know about its (pending) creation.

Some areas of specialization that currently seem attractive include:

- UNIX-based solutions
- Networking and network management, including network control tools and the development of end-to-end services to manage and support distributed systems, especially in multivendor environments
- Integration of voice, data, and image to permit companies greater control over communications
- Security
- New storage technologies

One key customer issue is how to introduce new technology to users. The training market may rapidly develop as a means to fully implement SI projects among users, and vendors who specialize in training may be rewarded.

A full-service offering, another competitive strategy, may present the best of both worlds. There does seem to be a natural evolution of professional services from a single service to multiple services to an integrated service offering. And, SI is a natural outgrowth that moves the management skills from managing a specific systems development activity to managing a complex development effort. By offering a broader spectrum of services in the life cycle, the non-SI vendor assumes a natural position between the isolated service and the integrated service and, in the process, attracts buyers who want SI-like services without paying the price or bearing the risks.

Full-service vendors must have sound development approaches (prototyping, for example) that are both salable to buyers and risk containing for the vendor.

Third-party relationships are important to cover short-falls in capabilities that may be required by buyers.

Full-service vendors may also engender a positive, "can-do" image. The notion of a full-service offering suggests the ability to offer a fully integrated set of products/services. This, then, becomes the competitive

difference: deployment of specialists and leveraged experiences. But vendors need to demonstrate these capabilities through proprietary technology, development facilities, and third-party relationships.

One problem with full service, of course, is keeping the specialists and generalists busy. Computer Task Group, for example, suffered financially when their "no layoffs" policy meant retaining staff that didn't have current assignments. As Computer Task Group and others have found out, staff sitting on the bench is a very unproductive drain on financial resources.

## 2. Join 'Em

It is not necessary to be an integrator to prosper in the SI marketplace. SI is not just a type of professional service, but also a channel of distribution. Large vendors may contract to smaller vendors with specific expertise or capabilities. Projects are too complex for any one company to address alone. If the SI vendor becomes a "generalist," the role of the specialist as a subcontractor may be important.

It may be that niche expertise is required to support the integrator. Except for the largest integrators, the integrator may be too busy managing to develop the specific expertise.

Smart integrators will not try to take the whole pie, but use others that fit the solution, and whom they know. For example, packaged software vendors may migrate to services to support their product and, in the process, subcontract products and services to primes. Vendors may ask product vendors to share product understanding with them. It's good for both parties: the vendor gets a product to support, and the product vendor is relieved of the drag of services on profits. Computer Task Group, as an example, has supported DBMS products from both Cullinet and IBM.

Teaming and subcontracting require several considerations:

Vendors must, first of all, determine where their strengths lie. Do they want to be a prime, a subcontractor, or both? Although vendors may want to decide this in general, it is best to maintain a flexible position. The final decision, then, may be based on the specifics of each opportunity. Every opportunity stands alone; teams are built on the specifics of the project and what each party best contributes to a winning proposal.

Both primes and subcontractors must know the opportunity and determine where they can offer something unique. Customers are looking for total solutions. Do contractors have something to offer?

As a potential subcontractor it is important to be visible to bidding integrators and to sell to the integrator for a part of a particular project.

Unlike strategic alliances discussed below, subcontracting involves making the vendor's capabilities available to many integrators. For the smaller professional services vendor in the SI market, these "one-shot" subcontracting relationships offer two necessary attributes: a perception of financial stability and access to the prime's development and integration centers.

A special type of relationship, a strategic alliance, goes beyond the single-project boundary and seeks to establish a more formal, longer term relationship with another vendor. The parties of the alliance will share some proprietary information and, perhaps, make financial investments in the relationship.

In the best alliances, equity must be involved. Both companies must have something to lose. These are not casual relationships, but involve an exclusive relationship with a unique capability.

Alliances may threaten product independence, but the vertical orientation may change that. All the vendors are good. Does the client value independence or ability to deliver?

In summary, the natural evolution of professional services firms is to expand horizontally and/or vertically. Vendors that choose to limit this expansion to well-defined niches and those who expand to full-service offerings will find ample opportunities, either independent of or in cooperation with SI.





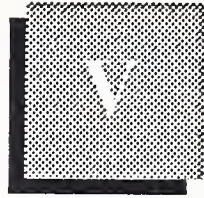


# Recommendations

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## Recommendations

The general expansion of the professional services market created both by “natural” and competitive forces, as well as the emergence of the SI market with its overall impacts of services providers, are sufficient reasons for professional services vendors to continually consider strategic directions. In this section critical decision factors and alternative thrusts are analyzed. Questions to be considered in this planning process are listed in Exhibit V-1.

EXHIBIT V-1

### QUESTIONS TO ADDRESS IN BUSINESS PLANNING

- Do We Really Need a Plan?
- What Type of Company Do We Want to Be?
- What Assets Do We Have to Help Us Become That Company?
- What Expansion Plan Should We Follow?
- How Will We Know When We Get There?

#### A

#### Select a Horizon Focal Point

The first logical consideration for professional services business planners is, simplistically stated, whether there should be a plan at all. Markets with aggressive growth patterns tend to afford the advantage of opportunistic expansion. That is, formal planning of strategic directions and investments in implementing these plans become secondary to “chasing” specific opportunities.

These opportunities, rather than a formal plan, tend to define the company's directions.

CSC, for example, has done exceptionally well by finding and winning opportunities and allowing the company to be shaped by the opportunity. In like fashion, AMS's recent directions have not been so much a product of planning as developing offerings to meet existing needs within their customer bases. In both cases, the vendor has moved to full service, perhaps integrator, status by seizing known opportunities.

CTG, on the other hand, has shown a combined approach. CTG's expansion to a national presence through acquisitions was carefully planned although their early SI business was opportunistic.

The difference in these approaches is the risk the vendor assumes to establish a position without definitive assurances that the position is a correct one. CTG, for example, did not always select geographic markets where it had business, but rather where it thought it could get business.

As discussed in this report, the "natural" expansion is opportunistic in that it is driven by specific buyer requirements. Planned expansion, even though it must stay close to these specific, current requirements, also heavily considers the longer-term directions of technology, general business environments, and the impact of the intersection of the two.

A compromise strategy that has received little attention is a process of deductive elaboration. In this process opportunities are carefully targeted both for their immediate result (e.g., financial reward) and for their longer-term result (e.g., capabilities development). Then, concerning the latter, the skills that have been developed are considered, not in the specific, but in the abstract: what these skills may become if applied to other targets. For example, Bell Atlantic contracted with Computer Horizons for DB2 specialists to consolidate three financial systems. In the process of the project, a development methodology, MigraData, was developed and is now being marketed by Computer Horizons. In all likelihood, the Computer Horizons staff also learned nonspecific skills (i.e., data modeling, data normalization, etc.) that could be deduced from the assignment and then elaborated and applied to other projects.

## B

### Assess All the Opportunities and Risks

Professional services vendors must decide, then, on what horizon—immediate, long-term, or some combination—they will fix their view.

With that horizon clearly in mind, vendors should assess the opportunities and risks that the horizon clearly presents. Several of these issues are discussed below.



## 1. Is Bigger Also Better?

An early consideration at this juncture is whether there should be expansion. Even though public companies are frequently rewarded because of their size, there is the alternative view that “it is not what you make, but what you keep.” Many small service firms have captured niches that are lucrative and intellectually challenging for the owners and employees. Unless their position is threatened, there may be no reason to seek aggressive expansion.

Most professional services companies must increase their market presence to survive. The market requires a broad range of service offerings, and competitors are encroaching from every position. To not expand, especially without an extremely unique specialty, is to sound the death knell.

With large SI contracts looming, too often expansion is focused exclusively on dollar opportunities. It’s a fact that CSC, for example, doesn’t consider many projects under \$10 million, a project size with which most service firms would be extremely happy. But size is not the only determiner for CSC and other serious integrators. They look at scope, complexity, and scale, too. They look at the cost of investment, odds of success, and the amount of risk assumed.

Whether the focus is on the SI business specifically or the professional service business in general, planners should look at these factors and determine whether the vendor can win. With product/service cores that can be leveraged, service firms may find opportunities in the \$250 thousand–\$5 million range where others won’t bid.

Expansion risks, especially in SI, are great and must be carefully managed. This involves establishing clear guidelines of corporate involvement, project management capabilities, subcontractor management methods and staff, etc. It also requires efficient tools for bid preparation, job reporting, accounting, and a well-stocked development facility.

## 2. The Large Fish/Small Pond – Small Fish/Large Pond Dichotomy

A very real risk of expansion is positioning the firm against formidable competition. Most professional services firms would be foolish to compete directly with CSC, IBM, Digital, Arthur Andersen, Boeing, Martin Marietta, etc. for SI business. If these are the vendors the firm most frequently runs into, the strategy should be to “join ‘em, not fight ‘em.”

On the other hand, there may be inherent limitations in the small-niche market. One strategy is to move horizontally to other industries with similar needs. Large-scale data management, leading-edge optical sys-



tems, image processing, voice/data/image telecommunications, and parallel and neuronal processing are just a few of the positions that may be available.

In this context, one is reminded of "Red" Adaire, the Texas-based oil well fire fighter who achieved his fame and fortune not by being the best fire fighter, but by being the only oil well fire fighter.

## C

### Assess Your Own Capabilities

To help find an appropriate position on the single-service-integrator continuum, vendors should inventory the corporate resources vis-a-vis the current/future market requirements to determine a position where the firm can compete effectively. A skills/capabilities inventory assessment of tangible and intangible assets, if conducted creatively, perhaps by using deductive elaboration, should uncover market gaps that could be effectively addressed. "Assets" that should be considered include: staff skills, staff experiences, industry/applications expertise, financial resources, customer base, geographic presence, proprietary products/services, third-party supply channels, development tools and facilities, corporate support functions, marketing/sales skills, and the like.

It is important to note not only strengths but weaknesses because part of the planning process is to seek means to "cover" these shortfalls by such means as internal development, acquisition, third-parties, etc.

When the company's pluses and minuses are aligned with the market requirements of the target time frame and the offerings of competitors, a picture should emerge that suggests a direction.

## D

### Plan a Clear Direction

At the broadest level, the direction, beyond maintaining the status quo, will be to expand horizontally, vertically, or diagonally.

Horizontal expansion for a professional services firm, in the context of this report, means developing additional services capabilities (e.g., information resources or business consulting, facilities management, application of development tools and methodologies, software products, etc.) or applying these capabilities to new markets/industries (e.g., federal government, health care, education, services, etc.).

Vertical expansion applies the existing expertise to additional communications or computer environments. (See the services-computer-communications cube in Exhibit III-6.) In this scenario the vendor offers a richer, deeper capability within a defined skill set.

Finally, expansion on the diagonal suggests developments in multiple areas at the same time. This is the typical direction for vendors that would be full-service providers or systems integrators: developing the

capability to provision projects in varied technological environments. (The specific investments required were discussed in previous sections.)

The specific action items of this direction should be prioritized, investments scheduled, and the entire plan communicated to the appropriate managers.

## E

### Work Your Plan

The ultimate test of management is to have the courage to work the plan. Although a rigorous approach to the above suggested steps will lead to some level of comfort in the plan, it will most certainly be questioned by industry watchers and tested by the market itself.

Rather than being distractors, these challenges represent opportunities to revisit the plan. If the plan is to be more than an item for the bookshelf, the company and the plan must be carefully scrutinized on a continual basis for synchronization. If there is a lack of congruence, adjustments are in order.

## F

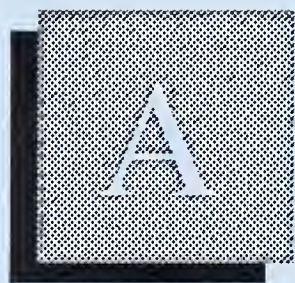
### Conclusions

The research completed for this report and the analyses made both suggest that the impacts of the systems integration market on nonparticipants will be more indirect (e.g., structural change) than direct (e.g., financial), at least in the short term. Expenditures in the professional services market are large and likely to remain so for the next five years, so there appears to be plenty of room for qualified vendors. However, the influential position of integrators within the marketplace may influence the direction, even the revenue, of nonparticipants.

Vendors are encouraged to consider the impacts of these structural changes as they traverse the natural course of evolution that is a part of being a professional services firm.

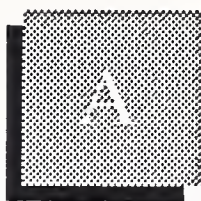






# Appendix: INPUT Definitions





## Appendix: INPUT Definitions

*Information Services* —Computer-related services involving one or more of the following:

- Processing of computer-based applications using vendor computers (called “processing services”).
- Services that assist users in performing functions on their own computers or vendor computer (called “software products” and/or “professional services”).
- Services that utilize a combination of hardware and software, integrated into a total system (called “turnkey systems”).

### A

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#### User Expenditures

All user expenditures reported are “available” (i.e., noncaptive, as defined below).

*Noncaptive Information Services User Expenditures*—Expenditures paid for information services provided by a vendor that is not part of the same parent corporation as the user.

*Captive Information Services User Expenditures*—Expenditures received from users who are part of the same parent corporation as the vendor.

### B

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#### Delivery Modes

*Processing services* —This category includes remote computing services, batch services, processing facilities management, on-line data bases, and value-added networks.

- *Remote Computing Services (RCS)* —Provision of data processing to a user by means of terminals at the user’s site(s). Terminals are con-



ected by a data communications network to the vendor's central computer. RCS includes four submodes.

- *Interactive* —Characterized by the interaction of the user with the system, primarily for problem-solving timesharing, but also for data entry and transaction processing; the user is on-line to the program/files. Computer response is usually measured in seconds or fractions of a second.
- *Remote Batch* —Where the user hands over control of a job to the vendor's computer, which schedules job execution according to priorities and resource requirements. Computer response is measured in minutes or hours.
- *Proprietary Data Base* —Characterized by the retrieval and processing of information from a vendor-maintained data base. The data base may be owned by the vendor or by a third party.
- *User Site Hardware Services (USHS)* —Those offerings provided by RCS vendors that place programmable hardware at the user's site rather than at the vendor's data center. Some vendors in the federal government market provide this service under the label of distributed data services. USHS offers:
  - ° Access to a communications network.
  - ° Access through the network to the RCS vendor's larger computers.
  - ° Local management and storage of a data base subset that will service local terminal users via the connection of a data base processor to the network.
  - ° Significant software as part of the service.
- *Batch Services* —These include data processing at vendors' sites for user programs and/or data that are physically transported (as opposed to transported electronically by telecommunications media) to and/or from those sites. Data entry and data output services, such as keypunching and computer output microfilm processing, are also included. Batch services include expenditures by users who take their data to a vendor site that has a terminal connected to a remote computer for the actual processing.
- *Processing Facilities Management (PFM)* —Also referred to as "Resource Management," "Systems Management," or "COCO" (contractor-owned, contractor-operated). PFM is the management of all or part of a user's data processing functions under a long-term contract of not

less than one year. This would include remote computing and batch services. To qualify as PFM, the contractor must directly plan, control, operate, and own the facility provided to the user—either onsite, through communications lines, or in a mixed mode.

- *Value-Added Networks (VANs)* —VANs typically involve common carrier network transmission facilities that are augmented with computerized switching. These networks have become associated with packet-switching technology because the public VANs that have received the most attention (e.g., Telenet and TYMNET) employ packet-switching techniques. However, other added data service features such as store-and-forward message switching, terminal interfacing, error detection and correction, and host computer interfacing are of equal importance.

Processing services are further differentiated as follows:

- *Cross-industry* services involve the processing of applications that are targeted to specific user departments (e.g., finance, personnel, sales) but that cut across industry lines. Most general-ledger, accounts receivable, payroll, and personnel applications fall into this category. Cross-industry data base services, for which the vendor supplies the data base and controls access to it (although it may be owned by a third party), are included in this category. General-purpose tools such as financial planning systems, linear regression packages, and other statistical routines are also included. However, when the application, tool, or data base is designed for specific industry use, then the service is industry-specific (see below).
- *Industry-specific* services provide processing for particular functions or problems unique to an industry or industry group. Specialty applications can be either business or scientific in orientation. Industry-specific data base services, for which the vendor supplies the data base and controls access to it (although it may be owned by a third party), are also included under this category. Examples of industry-specialty applications are seismic data processing, numerically controlled machine tool software development, and demand deposit accounting.
- *Utility* services are those for which the vendor provides access to a computer and/or communications network with basic software that enables users to develop and/or process their own systems. These basic tools often include terminal-handling software, sorts, language compilers, data base management systems, information retrieval software, scientific library routines, and other systems software.

*Software products* —This category includes user purchases of applications and systems software packages for in-house computer systems.



Included are lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement and maintain the package at the user's sites. Expenditures for work performed by organizations other than the package vendor are counted in the category of professional services. Fees for work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself. There are several subcategories of software products, as indicated below.

- *Applications Products* —Software that performs processing that services user functions directly related to solving a business or organizational need. The products can be:
  - *Cross industry Products* —Used in multiple-industry applications as well as the federal government sector. Examples are payroll, inventory control, and financial planning.
  - *Industry-Specific Products* —Used in a specific industry sector, such as banking and finance, transportation, or discrete manufacturing. Examples are demand deposit accounting, airline scheduling, and material resource planning.
- *Systems Software Products* —Software that enables the computer/communications system to perform basic functions. These products include:
  - *System Control Products* —Function during applications program execution to manage the computer system resources. Examples include operating systems, communication monitors, emulators, and spoolers.
  - *Data Center Management Products* —Used by operations personnel to manage the computer systems resources and personnel more effectively. Examples include performance measurement, job accounting, computer operations scheduling, and utilities.
  - *Applications Development Products* —Used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Examples include languages, sorts, productivity aids, compilers, data dictionaries, data base management systems, report writers, project control systems, and retrieval systems.

*Professional Services*—This category includes consulting, education and training, programming and analysis, and some facilities management as defined below.



- *Software development* —This service develops a software system on a custom basis. It includes one or more of the following: user requirements, system design, contract, and programming.
- *Education and Training* —Products and/or services related to information systems and services for the user, including computer-aided instruction (CAI), computer-based education (CBE), and vendor instruction of user personnel in operations, programming, and maintenance.
- *Consulting Services* —Information systems and/or services management consulting, program assistance (technical and/or management), feasibility analyses, and cost-effectiveness trade-off studies.
- *Professional Services Facilities Management (PSFM)* —This is a counterpart to processing facilities management, except the computing equipment is owned or leased by the client, not by the vendor. The vendor provides the staff to operate, maintain, and manage the client's facility.

*Turnkey Systems* (also known as integrated systems)—A turnkey system is an integration of systems and applications software with CPU hardware and peripherals, packaged as a single applications solution. The value added by the vendor is primarily in the software and support. Most CAD/CAM systems and many small-business systems are turnkey systems. This does not include specialized hardware systems such as word processors, cash registers, or process control systems, nor does it include Embedded Computer Resources for military applications. Turnkey systems are available either as custom or packaged systems.

- Hardware vendors that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors.
- Turnkey systems revenue is divided into two categories.
  - *Industry-specific systems* —that is, systems that serve a specific function for a given industry sector such as automobile dealer parts inventory, CAD/CAM systems, or discrete manufacturing control systems.
  - *Cross-industry systems* —that is, systems that provide a specific function that is applicable to a wide range of industry sectors such as financial planning systems, payroll systems, or personnel management systems.
- Revenue includes hardware, software, and support functions.

*Systems Integration* —Services associated with systems design, integration of computing components, installation, and acceptance of computer/communication systems. Systems integration can include one or more of the major information services delivery modes—professional services, turnkey systems, and software products. System components may be furnished by separate vendors (not as an integrated system by one vendor, called the prime contractor); services may be furnished by a vendor or by a not-for-profit organization. Integration services also may be provided with related engineering activities, such as SE&I (Systems Engineering and Integration) or SETA (Systems Engineering and Technical Assistance).

## C

### Hardware/Hardware Systems

*Hardware* —Includes all computer and telecommunications equipment that can be separately acquired with or without installation by the vendor and not acquired as part of an integrated system.

- *Peripherals* —Includes all input, output, communications, and storage devices other than main memory that can be connected locally to the main processor and generally cannot be included in other categories such as terminals.
- *Input Devices* —Includes keyboards, numeric pads, card readers, light pens and track balls, tape readers, position and motion sensors, and analog-to-digital converters.
- *Output Devices* —Includes printers, CRTs, projection-television screens, micrographics processors, digital graphics, and plotters.
- *Communication Devices* —Includes modems, encryption equipment, special interfaces, and error control.
- *Storage Devices* —Includes magnetic tape (reel, cartridge, and cassette), floppy and hard disks, solid state (integrated circuits), and bubble and optical memories.

*Terminals*—There are three types of terminals as described below:

- *User-Programmable* —Also called intelligent terminals, including:
  - Single-station or standalone.
  - Multistation shared processor.
  - Teleprinter.
  - Remote batch.

- *User Nonprogrammable*

- Single-station.
- Multistation shared processor.
- Teleprinter.

- *Limited Function* —Originally developed for specific needs, such as point-of-sale (POS), inventory data collection, controlled access, and other applications.

*Hardware Systems* —Includes all processors from microcomputers to supercomputers. Hardware systems may require type- or model-unique operating software to be functional, but this category excludes applications software and peripheral devices, other than main memory and processors or CPUs not provided as part of an integrated (turnkey) system.

- *Microcomputer* —Combines all of the CPU, memory, and peripheral functions of an 8- or 16-bit computer on a chip in the form of:

- Integrated circuit package.
- Plug-in board with more memory and peripheral circuits.
- Console including keyboard and interfacing connectors.
- Personal computer with at least one external storage device directly addressable by the CPU.

- *Minicomputer* —Usually a 12-, 16- or 32-bit computer that may be provided with limited applications software and support and may represent a portion of a complete large system.

- Personal business computer.
- Small laboratory computer.
- Nodal computer in a distributed data network, remote data collection network, or connected network, or connected to remote microcomputers.

- *Mainframe*—Typically a 32- or 64-bit computer with extensive applications software and a number of peripherals in standalone or multiple-CPU configurations for business (administrative, personnel, and logistics) applications; also called a general-purpose computer.

- *Large Computer* —Presently centered around storage controllers but likely to become bus-oriented and to consist of multiple processors or parallel processors. Intended for structured mathematical and signal processing and typically used with general-purpose, von-Neumann-type processors for system control.



- *Supercomputer* —High-powered processors with numerical processing throughout that is significantly greater than the fastest general-purpose computers, with capacities in the vicinity of 10-50 million floating point operations per second (MFLOPS). Supercomputers fit in one of two categories:
  - *Real Time* —Generally used for signal processing in military applications.
  - *Non-Real Time* —For scientific use in one of three configurations:
    - Parallel processors.
    - Pipeline processor.
    - Vector processor.
- *Newer Supercomputers* —with burst modes approaching 300 MFLOPS, main storage size up to 10 million words, and on-line storage in the one- to three-gigabyte class are also becoming more common.
- *Embedded Computer* —Dedicated computer system designed and implemented as an integral part of a weapon, weapon system, or platform; critical to a military or intelligence mission such as command and control, cryptological activities, or intelligence activities. Characterized by military specifications (MIL SPEC) appearance and operation, limited but reprogrammable applications software, and permanent or semipermanent interfaces. May vary in capacity from microcomputers to parallel processor computer systems.

## D

### Telecommunications

*Networks* —Electronic interconnection between sites or locations that may incorporate links between central computer sites and remote locations and switching and/or regional data processing nodes. Network services typically are provided on a leased basis by a vendor to move data, voice, video, or textual information between locations. Networks can be categorized in several different ways.

- *Common Carrier Network* —A public access network, such as provided by AT&T, consisting of conventional voice-grade circuits and regular switching facilities accessed through dial-up calling with leased or user-owned modems for transfer rates between 150 and 1200 baud.
- *Value-Added Network (VAN)* —(See listing under Section B, Delivery Modes.)
- *Local Area Network (LAN)* —Limited-access network between computing resources in a relatively small (but not necessarily contiguous)

area, such as a building, complex of buildings, or buildings distributed within a metropolitan area. Uses one of two signaling methods.

- *Baseband* —Signaling using digital waveforms on a single frequency band, usually at voice frequencies and bandwidth, and limited to a single sender at any given moment. When used for local-area networks, typically implemented with TDM to permit multiple access.
- *Broadband* —Transmission facilities that use frequencies greater than normal voice-grade, supported in local-area networks with RF modems and AC signaling. Also known as wideband. Employs multiplexing techniques that increase carrier frequency between terminals to provide:
  - ° Multiple (simultaneous) channels via FDM (Frequency Division Multiplexing).
  - ° Multiple (time-sequenced) channels via TDM (Time Division Multiplexing).
  - ° High-speed data transfer rate via parallel mode at rates of up to 96,000 baud (or higher, depending on media).

*Transmission Facilities*— Includes wire, carrier, coaxial cable, microwave, optical fiber, satellites, cellular radio, and marine cable operating in one of two modes depending on the vendor and the distribution of the network.

- *Mode* —may be either:
  - *Analog* —Transmission or signal with continuous-waveform representation, typified by AT&T's predominantly voice-grade DDD network and most telephone operating company distribution systems.
  - *Digital* —Transmission or signal using discontinuous, discrete quantities to represent data, which may be voice, data, record, video, or text, in binary form.
- *Media*—May be any of the following:
  - *Wire* —Varies from earlier single-line teletype networks, to two-wire standard telephone (twisted pair), to four-wire full-duplex balanced lines.
  - *Carrier* —A wave, pulse train, or other signal suitable for modulation by an information-bearing signal to be transmitted over a communications system, used in multiplexing applications to increase network capacity.

- *Coaxial Cable* —A cable used in HF (high-frequency) and VHF (very high frequency), single-frequency, or carrier-based systems; requires frequent reamplification (repeaters) to carry the signal any distance.
- *Microwave* —UHF (ultra-high-frequency) multichannel, point-to-point, repeated radio transmission, also capable of wide frequency channels.
- *Optical Fiber* —Local signal distribution systems employed in limited areas, using light-transmitting glass fibers and TDM for multichannel applications.
- *Communications Satellites*—Synchronous earth-orbiting systems that provide point-to-point, two-way service over significant distances without intermediate amplification (repeaters), but requiring suitable groundstation facilities for up- and down-link operation.
- *Cellular Radio* —Network of fixed, low-powered two-way radios that are linked by a computer system to track mobile phone/data set units. Each radio serves a small area called a cell. The computer switches service connections to the mobile unit from cell to cell.

## E

### Other Considerations

When questions arise about the proper place to count certain user expenditures, INPUT addresses them from the user viewpoint. Expenditures are then categorized according to what users perceive they are buying.

The standard industrial classification (SIC) codes are used to define the economic activity contained in generic sectors such as process manufacturing, insurance, or transportation.

The specific industries (and their SIC codes) included under these generic industry sectors are detailed in the exhibit.



## EXHIBIT A-1

**INDUSTRY SECTOR DEFINITIONS**

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
Discrete Manufacturing	23	Apparel
	25	Furniture
	27	Printing
	31	Leather
	34	Metal
	35	Machinery
	36	Electronics
	37	Transportation
	38	Scientific and Control Instruments
	39	Miscellaneous
Process Manufacturing	10	Metal Mining
	11	Anthracite Mining
	12	Coal Mining
	13	Oil and Gas Extraction
	14	Mining/Quarrying of Non-Metallic Minerals, except Fuels
	20	Food Products
	21	Tobacco
	22	Textile Products
	24	Lumber and Wood Products
	26	Paper Products
	28	Chemicals
	29	Petroleum
	30	Rubber and Plastics
	32	Stone, Glass, Clay
	33	Primary Metals
Transportation	40	Railroads
	41	Local Transit
	42	Motor Freight
	43	U.S. Postal Service
	44	Water Transportation
	45	Air
	46	Pipelines
	47	Transportation Services

## EXHIBIT A-1a

### INDUSTRY SECTOR DEFINITIONS (Cont.)

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
Utilities	49	Electric, Gas, and Sanitary
Telecommunications	48	Communications
Wholesale Distribution	50	Durable Goods
	51	Nondurable Goods
Retail Distribution	52	Building Materials, Hardware
	53	General Merchandise
	54	Food
	55	Automotive and Gas Stations
	56	Apparel
	57	Furniture
	58	Eating and Drinking
	59	Miscellaneous Retail
Banking and Finance	60	Banks
	61	Credit Agencies
	62	Security and Commodity Brokers
	67	Holding and Investment Offices
Insurance	63	Insurance (Life, Health, Etc.)
	64	Insurance Agents
Medical	80	Health Services
Education	82	Educational Services

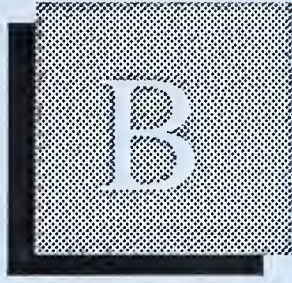
## EXHIBIT A-1b

### INDUSTRY SECTOR DEFINITIONS (Cont.)

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
Services	72	Personal Services
	73	Business Services (Excluding Information Services Companies Themselves)
	89	Miscellaneous Services
	66	Combinations of Real Estate, Insurance, Loans, Law Offices
	81	Legal Services
	76	Miscellaneous Repair
Federal Government	N/A	As Appropriate
State and Local Government	N/A	As Appropriate
Other Industries	01-09	Agriculture, Forestry, and Fishing
	15-17	Construction
	70	Hotels, Rooming Houses, Camps, and Other Lodging Places
	75	Automotive Repair, Services, and Garages
	78	Motion Pictures
	79	Amusement and Recreation Services, Except Motion Pictures
	83	Social Services
	84	Museums, Art Galleries, Botanical and Zoological Gardens
	86	Membership Organizations





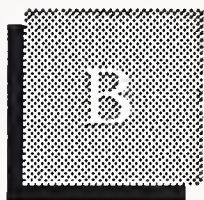


# Appendix: Professional Services Vendor Interview Protocol









## Appendix: Professional Services Vendor Interview Protocol

### I. Introduction

This is \_\_\_\_\_. I'm calling on behalf of INPUT, a market research and consulting firm. INPUT is investigating how the systems integration market will impact firms such as yours.

Do you have a few minutes to share your ideas and experiences with me?

### II. Qualification

A. First, are you engaged on any projects that most people would consider a systems integration job? (If asked, provide INPUT definition.)

1. If so, what is the nature of that project?

a. What is your role in the project?

- Prime? (If so, terminate interview.)
- Subcontractor?
- To whom? For what?
- How has this role worked out for you?

b. If not, why is that?

- No interest
- No opportunity has presented itself
- Specialty services only
- Other?

### III. Protocol

- A. Much has been said about the systems integration market.
1. What is your view of its future?
  2. In what ways has the SI market impacted your business?
    - a. Positives?
    - b. Negatives?
      - To the best of your knowledge, have you lost any business to an SI contractor?
      - What were the circumstances (e.g., type of project, industry, SI vendor)?
      - How much revenue do you think you may have lost?
      - Do you believe there are any long-term impacts of this (single) loss?
  3. (If it seems the respondent has had several experiences), With what customers (e.g., size, industry, applications, etc.) do you feel the impact will be the greatest? Why?
    - a. Related to this, much has been said about how an SI project helps to establish account control for the SI vendor. Have you noticed this event?
      - Specifically, how much add-on business do you believe you may have lost to a project's SI vendor or his subcontractors?
    - b. Also, SI projects seem to have the interest, if not the involvement, of corporate executives. Do you think these executives will become more a target of your selling effort because of this?
- B. Which of your service offerings will (benefit/suffer) the most from the SI marketplace? Why?
- | Benefit          | Suffer |
|------------------|--------|
| Consulting       |        |
| S/W Development  |        |
| Educ./Training   |        |
| Facilities Mgmt. |        |
- C. What strategies, if any, are/will you be implementing in response to the growing SI marketplace?

1. (Seek to) Become an SI.

(Get as many details as possible regarding industry and applications targets, competitive advantage, etc.)

Would you participate as a prime contractor in this market if you had the opportunity to do so?

- Why? That is, what is attractive about SI for your company?
- Why not? What is so unattractive about this market?
- What do you believe is the single biggest obstacle to this goal?
- If these constraints and issues were removed, would you participate?
- How do you intend to surmount this?

2. Subcontract to SIs.

- a. See above for details to solicit.
- b. Is (additional) subcontracting to SI primes in your immediate plans? Why/Why not?
- c. What have you done to accomplish this?

3. Solidify niche position (Get details.)

4. Add additional services such as...

5. Other strategies?







